

# *Carex roraimensis* (Cyperaceae) Revisited

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**ABSTRACT.** Study of plants referred to *Carex roraimensis* disclosed that three geographically isolated species were represented. *Carex roraimensis* itself, confined to Mt. Roraima and the Chimantá Massif, with retuse, obtuse, or acute pistillate scales shorter than the perigynia, short-beaked perigynia, and prolonged sheath apices, and two new species described here: *Carex marahuacana*, from Cerro Marahuaca, with longer-beaked perigynia, acuminate pistillate scales shorter than the perigynia, and sheath apices not prolonged beyond the base of the leaf blade; and *C. neblinensis*, from Cerro de la Neblina with long-beaked perigynia, acuminate pistillate scales as long as the perigynia, and prolonged sheath apices.

Review of *Carex* materials from the Venezuelan Guayana disclosed several undescribed species, and two of these are related to *Carex roraimensis* Steyermark. They are described below to make their names available for the treatment of the genus for the *Flora of the Venezuelan Guayana*.

Until now, all collections of *Carex* sect. *Ovales* from the tepuis in the Venezuelan Guayana were thought to be *Carex roraimensis* Steyermark. This species is a member of the *Carex bonplandii* Kunth complex, characterized by narrow perigynia with only narrow, blunt wings, but differs in its pale, hyaline to stramineous or greenish (when fresh) pistillate and staminate scales (resembling those of *Carex longii* Mackenzie), consistent presence of elongate inflorescence bracts subtending the lowermost spikes, and strong tendency to have the culms smooth or nearly so on the angles.

*Carex roraimensis* was described from Mt. Roraima and has been collected there a number of times, as well as nearby on the Chimantá Massif. Similar-looking plants referred to *C. roraimensis* have also recently been collected on Cerro de la Neblina and on Cerro Marahuaca. Specimens from these three areas do indeed look quite alike and seem to be close relatives. However, the Roraima-Chimantá, Cerro de la Neblina, and Cerro Marahuaca each have consistent, distinctive morphological features, and it seems clear that the three have

to be treated as distinct species in spite of their quite similar appearance.

For the sake of completeness and because much new material has accumulated since the description by Steyermark, a comprehensive description and exsiccatae list for *Carex roraimensis* are provided to accompany those of the other two species, *C. marahuacana* and *C. neblinensis*.

Major differences between these three species are summarized in the key below.

1. Pistillate scales retuse, obtuse, or acute; perigynium beaks 1–1.4(–1.6) mm long . . . . . *C. roraimensis*
1. Pistillate scales acuminate to acuminate-awned; perigynium beaks (1.4–)1.5–2.2 mm long . . . . . 2
2. Pistillate scales 3.7–4.8 mm long; perigynia 3.8–4.8 mm long, tapering to a narrowly triangular beak; upper sheaths prolonged ca. 0.6–1.8 mm beyond base of blade . . . . . *C. neblinensis*
2. Pistillate scales 2.7–3.6 mm long; perigynia 3.3–4.1 mm long, abruptly tapering to a  $\pm$  parallel-sided beak; upper leaf sheaths not prolonged beyond base of blade . . . . . *C. marahuacana*

***Carex marahuacana* Reznicek sp. nov. TYPE:** Venezuela. Amazonas: Dept. Atabapo, Cerro Marahuaca, summit on undulating plateau with islands of shrubs and Marahuacaea with stream branch leading to Salto de Monos and SE edge to Caño Iguapo, S and SE of summit Camp, 3°37'N, 65°23'W, 2520–2650 m, 26–27 Feb. 1985, Steyermark & Holst 130755 (holotype, MO). Figure 1G–I.

Plantae laxae caespitosae; culmi fertiles 15–55 cm alti; vaginae basales pallidae brunneae. Folia 4–6; laminae 4–45 cm longae, 1.5–3.3 mm latae; vaginae ca. 4–12 cm longae, ventraliter hyalinae, non prolongatae. Inflorescentiae 1–3 cm longae, erectae; spicae 5–7, gynaeandreae, ovoideae, 4.5–8.5 mm longae, 2.5–5.5 mm latae, basi staminata 0.5–1.5 mm longa. Squamae pistillatae 2.7–3.6 mm longae, triangulari-ovatae, acuminatae, hyalinae, pallide stramineae. Perigynia 3.3–4.1 mm longa, 1.2–1.4(–1.7) mm lata, ascendente, corpihus obovatis, in rostrum serrulatum (1.4–)1.6–2 mm longum abrupte contracta. Achenium 1.6–1.9 mm longum, 1–1.4 mm latum, ovatum. Stigmata 2.

Loosely caespitose in small clumps; fertile culms ca. 15–55 cm tall, erect,  $\pm$  obtusely trigonous, smooth except for scattered prickles on the angles; bladeless basal sheaths pale brown. Leaves 4–6, on

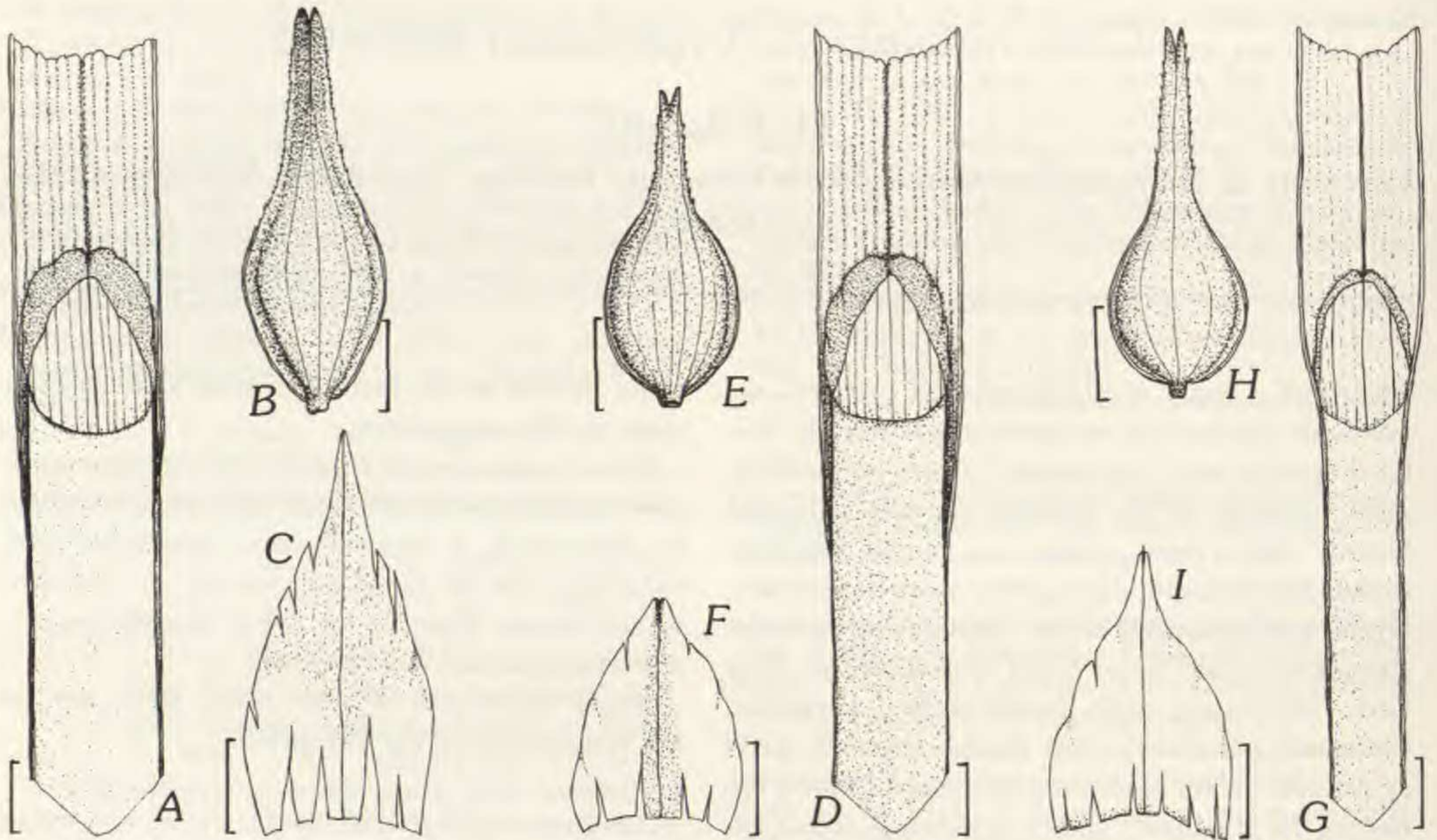


Figure 1. A–C, *Carex neblinensis* Reznicek. —A. Sheath apex. —B. Perigynium. —C. Pistillate scale. (From Steyermark 103755.) D–F, *Carex roraimensis* Steyermark. —D. Sheath apex. —E. Perigynium. —F. Pistillate scale. (From Steyermark et al. 128379.) G–I, *Carex marahuacana* Reznicek. —G. Sheath apex. —H. Perigynium. —I. Pistillate scale. (From Steyermark et al. 126035.) Scale bars = 1 mm.

lower  $\frac{1}{3}$ – $\frac{1}{5}$  of the culm; blades 4–45 cm long, 1.5–3.3 mm wide, plicate to involute, papillose above, smooth below, the margins antrorsely scabrous; leaf sheaths ca. 4–12 cm long, tightly enveloping culms, glabrous, green to pale brown or grayish brown; the inner band of sheaths glabrous, pale brown, hyaline, not prolonged above leaf base, the apex concave; ligules 0.5–1.7 mm long, rounded, the free portion entire,  $\pm$  thickened and brown, up to 0.3 mm long. Inflorescences 1–3 cm long, 5–8 mm wide, stiffly erect, spikes approximate, the lowest two spikes 1.2–5.5 mm distant, spikes single at nodes, sessile, lowermost bracts  $\pm$  setaceous, usually longer than the inflorescence, (1.6–)2.2–15 cm long and up to ca. 1.1 mm wide, conspicuous, sheathless, the upper bracts much reduced; spikes 5–7, gynaeandrous, ovoid, 4.5–8.5 mm long, pistillate portion ca. 3.8–7 mm long, ca. 2.5–5.5 mm wide, ca. 5–18-flowered, staminate portion 0.5–1.5 mm long, 1–3-flowered. Pistillate scales 2.7–3.6 mm long, 1.6–2.1 mm wide, triangular-ovate, acuminate to acuminate-awned, hyaline, pale stramineous with a green to stramineous center, 1-nerved. Staminate scales ca. 3–4.6 mm long, ca. 1.4–1.7 mm wide, narrowly ovate, acute to acuminate, hyaline, pale stramineous with a green to stramineous center, 1-nerved. Perigynia 3.3–4.1 mm long, 1.2–1.4(–1.7) mm wide, (2.2–)2.4–2.9 times as long as

wide, ascending, planoconvex with ovate bodies 1.7–2.4 mm long, widest 0.7–0.9 mm above base, narrowly blunt-edged, smooth, abruptly contracted into a beak, greenish to stramineous, glabrous, sessile, adaxial side  $\pm$  faintly 3–6-nerved over achene, abaxial side  $\pm$  faintly 11–15-nerved over achene; beaks (1.4–)1.6–2 mm long, 0.6–1 times as long as the perigynium body, flattened, narrow,  $\pm$  parallel-sided, serrulate-margined nearly to apex, the apex bidentate with teeth up to 0.5 mm long. Achenes 1.6–1.9 mm long, 1–1.4 mm wide, 1.1–1.8 times as long as wide, biconvex, ovate, pale brown, short-stipitate, apiculum very short; style straight; stigmas 2. Stamens 3, anthers ca. 1.4–1.8 mm long.

Streambanks and open, wet areas, 2500–2650 m; endemic to Cerro Marahuaca.

Though very similar in overall aspect to many other species of *Carex* section *Ovales*, and especially to *C. roraimensis* and *C. neblinensis*, the peculiar, virtually parallel-sided perigynium beak (Fig. 1H) is unique to this species. Unlike either *C. roraimensis* or *C. neblinensis*, the leaf sheaths in this species are not prolonged beyond the base of the leaf blade.

*Paratypes.* VENEZUELA. Amazonas: Dept. Atabapo, Cerro Marahuaca, HUHA, Cumbre antiplanicie no arbolada más o menos plana, con piedras expuestas, río aba-

jo, 3°40'N, 65°30'W, 2580 m, 31 Jan. 1982, *Steyermark et al.* 125931 (VEN); Dept. Atabapo, Cerro Marahuaca, FHUIF, Cumbre, zona pantanosa no arbolada en la antiplanicie, río arriba, 3°35'N, 65°20'W, 2480–2500 m, 2 Feb. 1982, *Steyermark et al.* 126035 (NY); Dept. Atabapo, Cerro Marahuaca, Cumbre, parte central de la Meseta Sur-Este, al lado de una grieta, a lo largo de la Quebrada Yekuana, afluente del río Negro, 3°40'30"N, 65°26'30"W, 2560 m, 10–12 Oct. 1983, *Steyermark* 129539 (VEN).

***Carex neblinensis*** Reznicek, sp. nov. TYPE: Brazil. Cerro de la Neblina, Planicie de Zuloaga, Río Titirico, 10–15 Oct. 1970, *Steyermark* 103755 (holotype, NY). Figure 1A–C.

Plantae laxae caespitosae; culmi fertiles 20–90 cm alti; vaginae basales pallidae brunneae. Folia 3–5; laminae 3–40 cm longae, 1.5–3 mm latae; vaginae ca. 4–15 cm longae, ventraliter hyalinae, pallide brunneae, 0.6–1.8 mm prolongatae. Inflorescentiae 1.4–3.4 cm longae, erectae; spicae (2–)3–7, gynaeandreae, anguste obovoideae, 6–9 mm longae, 3–4.5 mm latae, basi staminata 0.5–2 mm longa. Squamae pistillatae 3.7–4.8 mm longae, lanceolatae vel anguste triangulari-ovatae, acuminatae, stramineae. Perigynia 3.8–4.8 mm longa, 1.2–1.5 mm lata, adpressa, corpihus ellipticis, in rostrum serrulatum 1.5–2.2 mm longum contracta. Achenium 1.7–2.1 mm longum, 1–1.2 mm latum, ovatum. Stigmata 2.

Loosely caespitose in small clumps; fertile culms ca. 20–90 cm tall, erect,  $\pm$  obtusely trigonous, with scattered to dense prickles on the angles; bladeless basal sheaths pale brown. Leaves 3–5, on lower  $\frac{1}{4}$ – $\frac{2}{5}$  of the culm; blades 3–40 cm long, 1.5–3 mm wide, plicate to involute, smooth, the margins and midrib antrorsely scabrous distally; leaf sheaths ca. 4–15 cm long, tightly enveloping culms, glabrous, green to pale brown or grayish brown; the inner band of sheaths glabrous, pale brown, hyaline, prolonged 0.6–1.8 mm above leaf base, the apex concave; ligules ca. 1.6–3.5 mm long, rounded, the free portion entire, hyaline, whitish to pale brown, up to 0.8 mm long. Inflorescences 1.4–3.4 cm long, 6–9 mm wide, stiffly erect, spikes approximate, the lowest two spikes 1.9–9 mm distant, spikes single at nodes, sessile, lowermost bracts  $\pm$  setaceous, usually longer than the inflorescence, ca. 2–8 cm long and up to ca. 1.4 mm wide, conspicuous, sheathless, the upper bracts much reduced; spikes (2–)3–7, gynaeandrous, narrowly obovoid, 6–9 mm long, pistillate portion ca. 5–7 mm long, ca. 3–4.5 mm wide, ca. 5–10-flowered, staminate portion ca. 0.5–2 mm long, 2–6-flowered. Pistillate scales 3.7–4.8 mm long, 1.4–2 mm wide, lanceolate to narrowly triangular-ovate, acuminate, stramineous with a green to brown center and hyaline margins, 1-nerved. Staminate scales ca. 4–4.8 mm long, ca. 1.4–1.7 mm wide, narrowly ovate, acuminate, stramineous with a green center and hyaline margins, 1-nerved. Perigynia 3.8–4.8 mm long, 1.2–1.5 mm

wide, 2.8–3.5 times as long as wide,  $\pm$  appressed, planoconvex with elliptic bodies 2.1–3 mm long, widest 1.1–1.7 mm above base, narrowly blunt-edged, smooth, tapering into a beak, greenish to stramineous, glabrous, sessile, adaxial side distinctly 3–7-nerved over achene, abaxial side distinctly 7–11-nerved over achene; beaks 1.5–2.2 mm long, 0.5–0.9 times as long as the perigynium body, flattened, narrowly triangular, serrulate-margined nearly to apex, the apex bidentate with teeth up to 0.3 mm long. Achenes 1.7–2.1 mm long, 1–1.2 mm wide, 1.6–1.8 times as long as wide, biconvex, ovate, pale brown, short-stipitate, apiculum very short; style straight; stigmas 2. Stamens 3, anthers ca. 1.6–1.7 mm long.

Swampy savannas, wet woodlands, and open, wet areas, 2100–2400 m; Cerro de la Neblina.

*Carex neblinensis* has longer perigynia than either *C. marahuacana* or *C. roraimensis*, but they are largely concealed by the equally long pistillate scales. As in *C. roraimensis*, the sheaths are prolonged beyond the base of the leaf blade.

*Paratypes.* BRAZIL. Sierra da Neblina, trail to Pico Phelps, 2 Dec. 1965, *Maguire et al.* 60457 (NY); VENEZUELA. Amazonas: Dept. Rio Negro, Cerro de la Neblina, Camp II, 2.5–3.5 km NE of Pico Phelps (= Neblina), 00°50'00" to 12"N, 65°58'48"W, 2085–2100 m, 17–22 Feb. 1984, *Funk* 6268 (VEN); *Funk* 6297 (VEN).

***Carex roraimensis*** Steyermark, *Fieldiana*, Bot. 28(1): 67. 1951. TYPE: Venezuela. Bolívar: summit of Mount Roraima, on southern half of the summit between Summit camp, Great Central Rift, Central Swamp, and pond at southern end, 2700–2740 m, 28 Sep. 1944, *Steyermark* 58870 (holotype, F, photo MICH; isotype NY). Figure 1D–F.

Loosely caespitose in small clumps; fertile culms ca. 20–85 cm tall, erect,  $\pm$  obtusely trigonous, with scattered to dense prickles on the angles, especially just below the inflorescence; bladeless basal sheaths pale brown. Leaves 4–6, on lower  $\frac{1}{4}$ – $\frac{2}{5}$  of the culm; blades 2–35 cm long, 1.5–3.5 mm wide,  $\pm$  flat to involute, papillose above, smooth below, the margins and midrib antrorsely scabrous distally; leaf sheaths ca. 2–10 cm long, tightly enveloping culms, glabrous, green to pale brown or grayish brown; the inner band of sheaths glabrous, pale brown, hyaline, prolonged 0.4–3.5(–6.5) mm above leaf base, the apex truncate to concave; ligules ca. 1.5–7 mm long, rounded, the free portion entire, hyaline and whitish to brown, up to 0.6 mm long. Inflorescences 1.4–3.8 cm long, 5–13 mm wide, stiffly erect, spikes  $\pm$  approximate, the lowest two

spikes 2.2–11 mm distant, spikes single at nodes, sessile, lowermost bracts  $\pm$  setaceous, usually longer than the inflorescence, ca. 1.2–5 cm long and up to ca. 1.1 mm wide, conspicuous, sheathless, the upper bracts much reduced; spikes (3–)4–9, gynaeandrous, obovoid, 5.5–10.5 mm long, pistillate portion ca. 5–7.5 mm long, ca. 3.5–5.5 mm wide, ca. 5–20-flowered, staminate portion ca. 0.5–3 mm long, ca. 2–8-flowered. Pistillate scales 2.2–3.3 mm long, 1.4–2 mm wide, broadly ovate, retuse, obtuse, or acute, hyaline with a greenish to stramineous center, 1-nerved. Staminate scales ca. 2.8–3.7 mm long, ca. 1.5–1.8 mm wide, ovate, emarginate and short-awned, retuse, or acute, greenish to stramineous with hyaline margins, 1-nerved. Perigynia 3.2–4.1 mm long, 1.1–1.5(–1.8) mm wide, (2.1–)2.3–2.7(–3) times as long as wide, ascending to spreading,  $\pm$  planoconvex with elliptic bodies 2–2.8 mm long, widest 1.1–1.7 mm above base, narrowly blunt-edged, smooth, tapering into a beak, greenish to stramineous, glabrous, sessile, adaxial side distinctly 3–8-nerved over achene, abaxial side distinctly 7–11-nerved over achene; beaks 1–1.4(–1.6) mm long, 0.4–0.7 times as long as the perigynium body, flattened, narrowly triangular, serrulate-margined nearly to apex, the apex bidentate with teeth up to 0.2 mm long. Achenes 1.7–2 mm long, 1–1.2 mm wide, 1.5–2 times as long as wide, biconvex, ovate-elliptic, pale brown, short-stipitate, apiculum very short; style straight; stigmas 2. Stamens 3, anthers ca. 1.7–2.1 mm long.

Open, wet areas and open, swampy savannas, 1850–2740 m; endemic to Mt. Roraima and the Chimantá Massif.

*Paratypes.* BRAZIL. **Roraima:** an Bächen auf dem Gipfel, Jan. 1910, *Ule* 8536 (K). GUYANA/BRAZIL. **Mt. Roraima:** summit, 26 Nov. 1927, *Tate* 433 (NY). VENEZUELA. **Bolívar:** Chimantá Massif, Central Section, near lower Cumbre Camp, 1863 m, 2 Feb. 1955, *Steyermark & Wurdack* 355 (MICH); Chimantá Massif, Central Section, swamp along E branch of headwaters of Rio Tirica, 2120 m, 12 Feb. 1955, *Steyermark & Wurdack* 799 (F, NY); Chimantá Massif, Central Section, open swampy savanna along W branch of headwaters of Rio Tirica above Upper Falls, 2090 m, 17 Feb. 1955, *Steyermark & Wurdack* 914 (F, MICH); Distrito Piar, Macizo del Chimantá, Altiplanicie en la base meridional de los farallones superiores del Apacará-tepui, sector norte del Macizo, 5°20'N, 62°12'W, 2200 m, 30 Jan.–1 Feb. 1983, *Huber & Steyermark* 7028 (VEN); Distrito Piar, Macizo del Chimantá, Altiplanicie en la base meridional de los farallones superiores del Apacará-tepui, sector norte del Macizo, 5°20'N, 62°12'W, 2200 m, Jan.–1 Feb. 1983, *Steyermark et al.* 128379 (MO, NY); Roraima Tepuy, Sector Noreste, Lago Gladys, 5°15'36"N, 60°15'W, 2700 m, 3–5 April 1989, *F. Delascio C.* 13938 (VEN).

*Ule* 8536 was referred by Kükenthal (1921) to *Carex bonplandii*, but as Steyermark (1951) surmised, it is *C. roraimensis*. *Steyermark & Wurdack* 355 is peculiar in that some spikes also have a few staminate flowers at the apex.

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